

Interventions for Pandemic Influenza at US Airports of Entry

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Health Alert Notice

건강 경보 공지사항

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DEPARTMENT OF HEALTH AND HUMAN SERVICES



Overview of Presentation

- Influenza and SARS transmission on aircraft
- Actions when CDC Quarantine Station is notified of ill traveler enroute on international flight
- Proposed public health responses at US international airports in a pandemic
- Unresolved issues and challenges



Influenza Virus Transmission

- Close contact
 - Primarily by large respiratory droplets
 - Possibly small particle “short distance” aerosols
- Indirect transmission (example: hand contact with secretions)
- Hard to predict behavior of new subtype



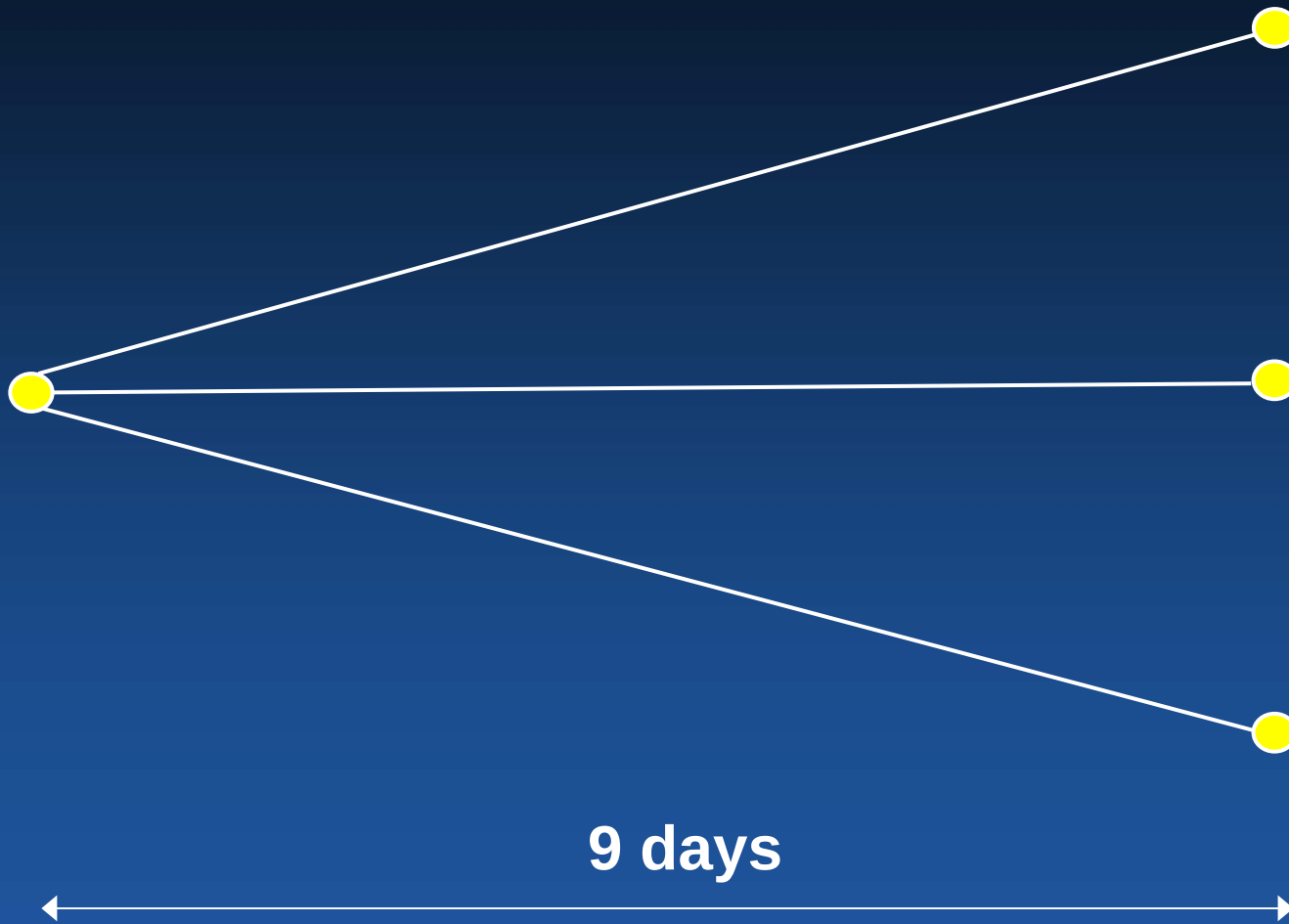
Influenza Misconception #1:

Influenza is “highly transmissible”

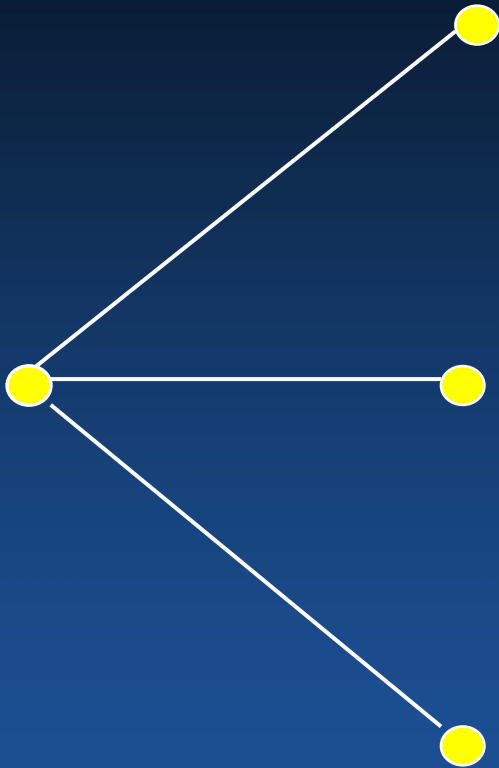
- Average R_0 of influenza is 2-3 (like SARS)
 - Can be higher in closed settings
 - Probably higher for children
 - In comparison: R_0 for measles is 12
- Explosive influenza outbreaks are due to short serial interval between cases (2-4 days)
 - Short incubation period (1-2 days)
 - Peak infectivity at onset of illness



SARS: $R_0=3$, serial interval=9 days



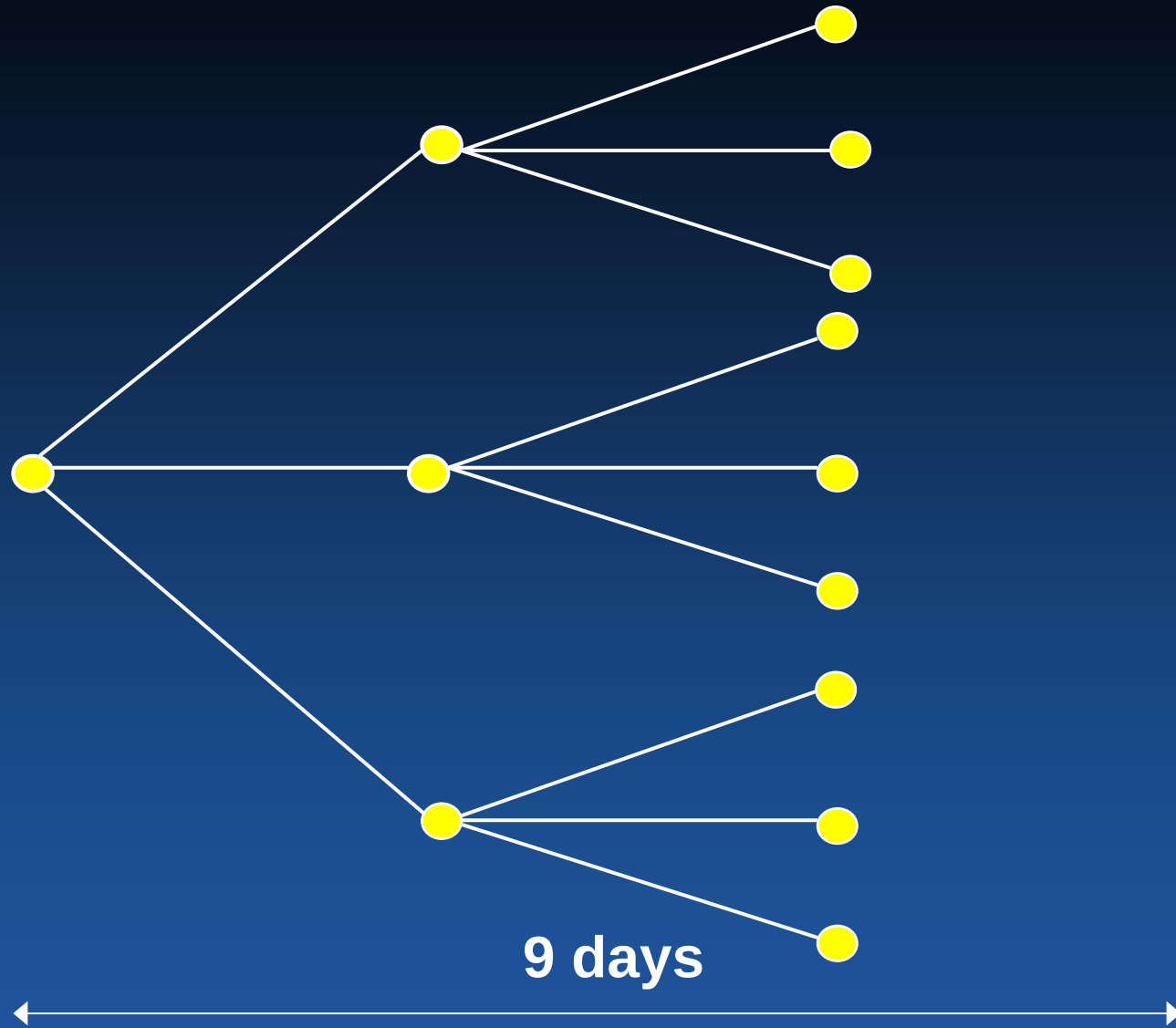
Influenza, if $R_0=3$, Serial interval=3 days



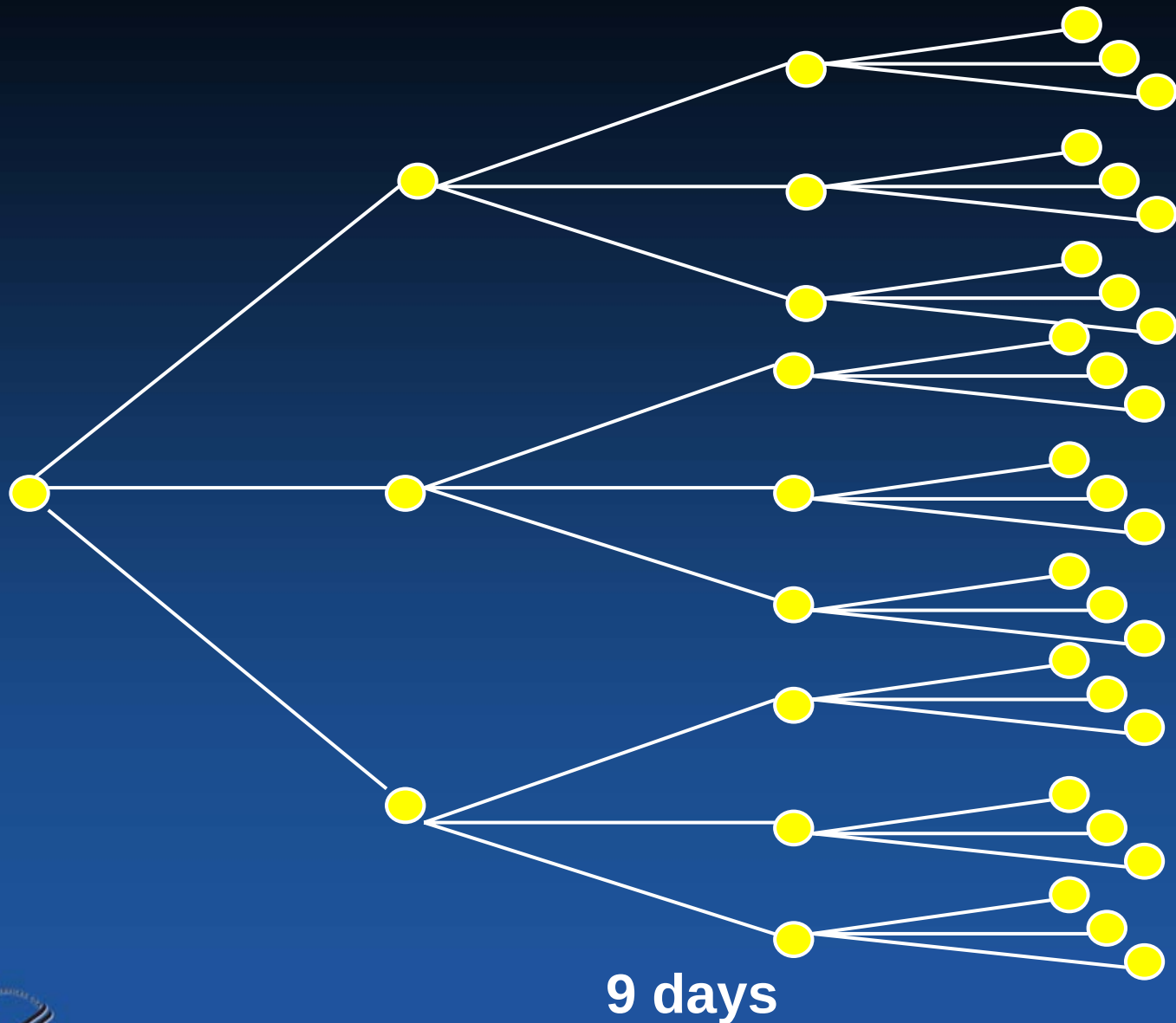
9 days



Influenza, if $R_0=3$, Serial interval=3 days



Influenza, if $R_0=3$, Serial interval=3 days



Influenza Misconception # 2:

“There is substantial transmission before symptoms or from asymptomatic cases”

- Never documented, but probably occurs
- Infectivity has been inferred from nasopharynx virus shedding, not transmission
- Virus shedding (presence and titer) is highly correlated with fever and symptoms (presence and severity)

Reference: WHO Writing Group. Emerg Inf Dis 2006;12:81-7



Influenza virus shedding without symptoms

- Low titer- unclear importance in transmission
- During incubation period:
 - Adults: 24-48 hours before illness
 - Children: in 1 study, in 8% of illnesses; virus detected up to 6 days before illness
- Asymptomatic shedding:
 - 30-50% in seasonal epidemics when many people have some immunity
 - ? during a pandemic

Reference: WHO Writing Group. Emerg Inf Dis 2006;12:81-7



Seasonal Influenza Transmission on Aircraft

- Alaska, 1977. Plane on ground 3 hours without ventilation. Index passenger with influenza-like illness (ILI). 72% of 72 passengers developed ILI. (+ lab)
 - Moser M. Am J Epi 1979;110:1-6
- Australia, 1999. 3 hour 20 min flight. Index patient with ILI. 20% of 75 passengers developed ILI, 7% upper resp illness, (no lab)
 - Marsden AG, Med J Australia 2003;179:172-3



Influenza-like Illness on an Airplane, Australia, 1999

75 passengers, 3 hour 20 min flight, index patient with influenza-like illness

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
G						F			F		I		F		F
F	M				M				M	M	F		F	F	
E					M						F			F	
Aisle															
B									F	F	F			F	
A			F								F				

I= index case

F=influenza-like illness (N=15)

M=mild upper respiratory illness (N=5)

Source: Marsden AG, Med J Australia 2003;179:172-3



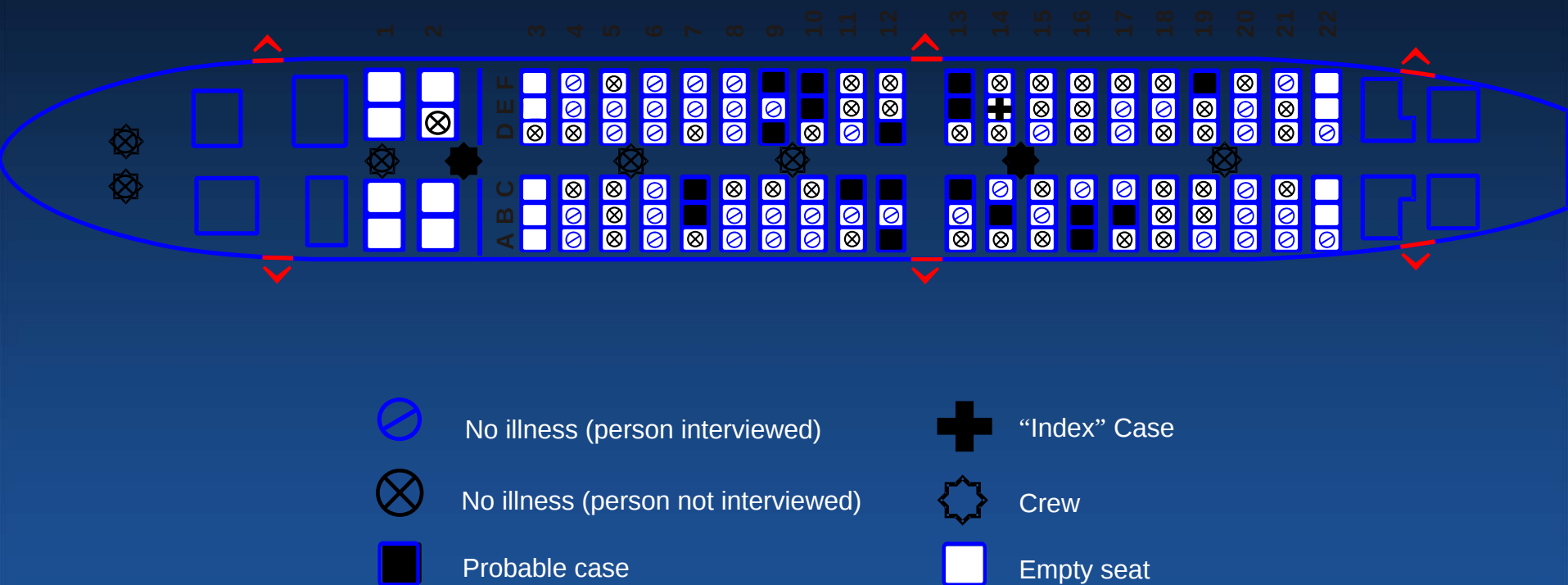
Rates of SARS Transmission on Aircraft

Flight	Duration	Index patient	# Infected / # on plane (%)
1	90 min	1 Pre-symptomatic	0/315 (0.0)
2	3 hours	1 Fever, cough	22/120 (18.3)
3	90 min	2 Fever; 2 Fever, cough	1/246 (0.4)

Source: Olsen SJ, et al. NEJM 2003;349:2416-22



SARS Transmission on an Aircraft, 2003: Seating on Flight #2, Boeing 737-300



Source: Olsen SJ, et al. NEJM 2003;349:2416-22



CDC Quarantine Stations Jurisdictions



Last updated: March 1, 2006

Ill Passenger on International Flight Arriving at US Airport- General Public Health Measures

- If notified while in-flight, ask airline re age, symptoms, date of onset, where traveled and activities
- CDC Quarantine Officer (or state/local health dept.) meets plane with Customs & Border Protection
- Ill passenger evaluated by paramedics, interviewed by Q officer re clinical history and exposures
- All other passengers remain seated until clearance



III Arriving Air Passenger at US Port of Entry: Illness of Public Health Concern

- Quarantinable (e.g., SARS, influenza H5N1)
 - Isolate passenger, transport by paramedics
 - Consider quarantine other passengers
- Not quarantinable but other public health concern (e.g., measles, meningococcus)
 - Ask nearby passengers to provide contact information
 - Traveler's health alert notice to these passengers
- Collaboration with state/local health dept (s).



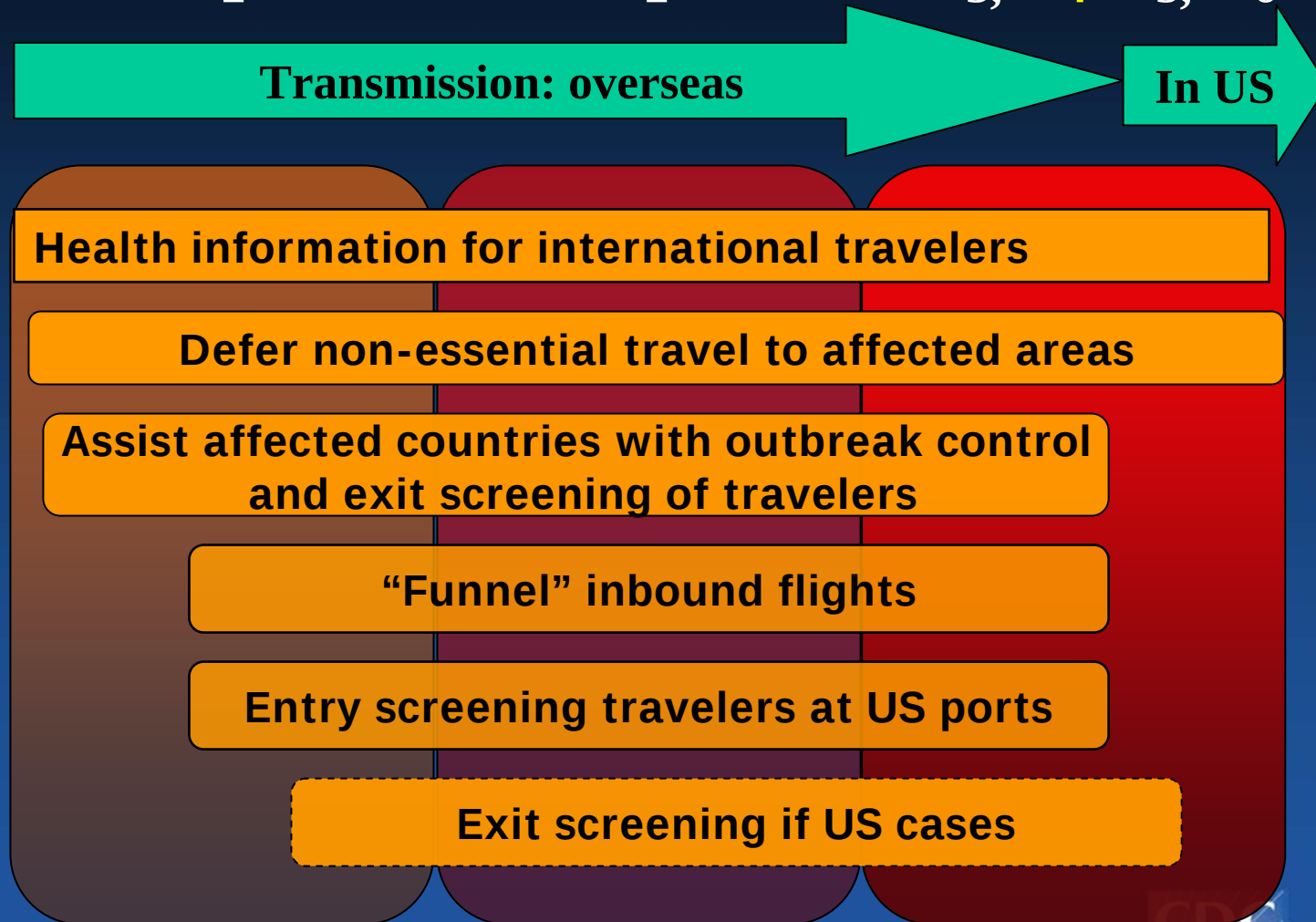
III Arriving Air Passenger at US Port of Entry: In-flight Measures (IATA)

- Separate ill passenger if possible
- Surgical mask for coughing person, if tolerated-or tissues
- Hand sanitizers, dedicated disposal receptacles for soiled items
- Dedicated lavatory if possible; otherwise disinfect lavatory surfaces after patient use
- Dedicated flight attendant, if possible
- Ask traveling companions re similar symptoms
- Passengers 3 rows in front and behind asked to complete passenger locator cards, “if available”



Proposed U.S public health response: international borders

WHO phase:	4	5	6
US stage:	2	2	3, 4*, 5, 6



*** First case in North America**



Unresolved issues and challenges

- Housing and support of quarantined passengers.
- When during US stage 2 (H2H outbreak overseas) do funneling of inbound aircraft and screening begin?
- What measure(s) are used ?
 - Active declaration by captain that no illness aboard?
 - Visual inspection, health declaration, thermal scanning?
 - Clinical and epidemiologic criteria for screening
- Scientific challenges (incubation period; rapid lab dx)
- Implementation challenges (logistics, cost)
- When does funneling and screening end?



Acknowledgements

CDC

- Michael Doney & others at 18 CDC Quarantine stations
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